Claims

[c1]   A method of guiding an automated guided vehicle, comprising:

providing a guide path defined with respect to a physical path;

controlling a vehicle to generally follow said guide path;

detecting the presence of an obstacle at said guide path; and

controlling the vehicle around the obstacle and back to said guide path.

[c2]   The method of guiding of claim 1 wherein said detecting included providing a sensor on the vehicle and detecting an obstacle with said sensor.

[c3]   The method of guiding of claim 2 wherein said sensor comprises a scanning laser.

[c4]   The method of guiding of claim 1 including defining a limited control area, controlling the vehicle around the obstacle when the presence of the obstacle is detected in said limited control area and stopping the vehicle when the presence of the obstacle is detected outside of said limited control area.

[c5]   The method of guiding of claim 1 including detecting
that an obstacle has been avoided and controlling the
vehicle back to said guide path in response to the obsta-
cle having been avoided.

[c6]   The method of guiding of claim 1 wherein said vehicle is
navigated by dead-reckoning navigation and wherein
said guide path is a virtual guide path defined in a mem-
ory of a computer.

[c7]   The method of guiding of claim 6 wherein said dead-
reckoning navigation comprises gyroscope-based navi-
gation.

[c8]   The method of claim 6 including updating at least one of
position and orientation of the vehicle are updated to
correct for drift in said dead-reckoning navigation.

[c9]   The method of claim 8 wherein said updating is per-
formed by a high frequency location system.

[c10]   The method of claim 9 wherein said high frequency loca-
tion system comprises a plurality of stationary high fre-
quency electromagnetic energy emitting and detecting
beacons positioned at known locations and at least one
mobile electromagnetic energy beacon positioned on-
board the vehicle, said mobile beacon communicating

with said plurality of stationary beacons using high frequency radio electromagnetic energy.

[c11] The method of claim 8 wherein said updating comprises positioning a plurality of spaced apart magnets along said guide path at known locations and detecting said magnets with a magnetic detector of said vehicle.

[c12] The method of claim 11 including positioning said plurality of magnets both on said guide path and off of said guide path, wherein said magnetic detector should detect a magnet when the vehicle is traveling on the guide path and when the vehicle is avoiding an obstacle.

[c13] The method of claim 12 wherein said magnets are arranged in diagonal patterns with respect to the guide path.

[c14] The method of claim 1 wherein said detecting the presence of an obstacle includes detecting unobstructed passage space adjacent the obstacle.

[c15] The method of claim 14 wherein said controlling the vehicle around the obstacle includes determining an offset to the guide path and controlling the vehicle along said offset.

[c16] The method of claim 1 wherein said controlling the vehi-

cle around the obstacle includes determining an offset to the guide path and controlling the vehicle along said offset.